

Claims

What is claimed is:

1. An acoustically damping composite article, comprising a metal foam, said metal foam having an open cell structure, impregnated with a solid, bulk non-elastomeric polymer.
 2. The composite article of claim 1, wherein said metal is selected from the group consisting of aluminum, aluminum base alloys, titanium, titanium base alloys, nickel, nickel base alloys, copper, copper base alloys, iron, iron base alloys, zinc, zinc base alloys, lead, lead base alloys, silver, silver base alloys, gold, gold base alloys, platinum, platinum base alloys, tantalum, and tantalum base alloys.
 3. The composite article of claim 1, wherein said polymer is selected from the groups consisting of epoxies, acrylics, hardened silicones, polyurethanes, polyimides, polyvinyls, polycarbonates, hardened natural rubbers, hardened synthetic rubbers, phenolics, polyolefins, polyamides, polyesters, fluoropolymers, poly(phenylene ether ketones), poly(phenylene ether sulfones), poly(phenylene sulfides) and melamine-formaldehyde resins.

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4. The composite article of claim 1, wherein said metal is an aluminum base alloy foam.
5. The composite article of claim 1, wherein said metal is a copper foam or a copper base alloy foam.
6. The composite article of claim 1, wherein said metal is a zinc foam or a zinc base alloy foam.
7. The composite article of claim 3, wherein said metal is an aluminum foam or an aluminum base alloy foam.
8. The composite article of claim 3, wherein said metal is a copper foam or a copper base alloy foam.
9. The composite article of claim 3, wherein said metal is a zinc foam or a zinc base alloy foam.
10. The composite article of claim 3, wherein said metal is a titanium foam or a titanium base alloy foam.
11. The composite article of claim 1, wherein said polymer is an epoxy.
12. The composite article of claim 1, wherein said polymer is an

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acrylic.

13. The composite article of claim 1, wherein said polymer is a hardened silicone rubber.

14. The composite article of claim 1, wherein said polymer is a hardened natural rubber.

15. The composite article of claim 1, wherein said polymer is a hardened synthetic non-silicone rubber.

16. The composite article of claim 1, wherein said polymer is a phenolic.

17. The composite article of claim 1, wherein said cells have a locally uniform diameter.

18. The composite article of claim 17, wherein said metal foam has a gradation of pores sizes in at least one direction along the metal foam.
Subj

19. A composite article according to claim 1, wherein said composite article is in the form of a sheet.

Subj 20. A laminate comprising a plurality of sheets according to claim *b2*

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cont.* 19 bonded together.

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21. An acoustically damping composite article, comprising a metal foam, said metal foam having an open cell structure, impregnated with solid bulk polymer, said metal foam being, along its smallest dimensions, no smaller than 3 times the average diameter of said cells.
22. A method of forming a composite comprising the steps of:
impregnating a metal foam, said metal foam having an open cell structure, with a resin component; and
converting said resin component, within said cells, to a bulk solid, non-elastomeric polymerized resin.
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